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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/038,787	12/31/2001	Peter L. Doyle	42390.P11486	4083

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EXAMINER

CASCHERA, ANTONIO A

ART UNIT	PAPER NUMBER
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2697

DATE MAILED: 09/26/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/038,787

Applicant(s)

DOYLE, PETER L.

Examiner

Antonio A Caschera

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
 - a. The word, "the" in the phrase, "...display screen pixels that represent the each primitive..." should be omitted (see page 3, lines 11-13).

Appropriate correction is required.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: #138, 142, 144, 146 and 158 of Figure 2 and #170 of Figure 4. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 1, 2, 4, 6-8, 10-12, 14, 16-18, 20-22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (U.S. Patent 6,144,387) in view of Smith et al. (U.S. Patent 6,424,345 B1).

In reference to claims 1, 11 and 21, Liu et al. discloses a rendering method and system for image clipping of a display image area in a guard memory region (see column 3, lines 10-24 and Figures 6 and 7). Liu et al. discloses determining object-zone intersections for objects in a scene by determining the intersections of object vertices in comparison to clipping and guard memory regions (see Figure 6). Liu et al. discloses defining a visible region using a first rectangle as a display image area in guard memory (see #410 of Figures 5a & 5b). Note, the office interprets the display image area defined with screen coordinates because the display image area is located within guard memory which stores pixel data. Liu et al. also discloses the guard memory storing a set of pixels of an image plane, arranged in a pixel array, which extends beyond the display image area of the image plane (see column 3, lines 13-16, column 5, 19-25 and #510 of Figures 5a & 5b). Note, the office interprets the “second rectangle” of applicant’s claims substantially similar in functionality to the guard memory boundaries as the guard memory stores pixel data, well known to comprise of color data (see column 1, lines 28-30), and effects the number of clipping operations performed as the size or resolution of the memory is varied. Also note, the office interprets applicant’s “area threshold” substantially similar to the size of the guard memory. Liu et al. discloses discarding objects completely outside the display image area as projection #400d in Figure 5a is discarded and not shown in Figure 5b (see column 5, lines 30-42). Note, the limitation of, “in one or more directions” is seen to be inherent to the clipping method and apparatus of Liu et al. as Liu et al. explicitly discloses discarding projections located

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entirely outside display image area (see column 5, lines 35-37). Liu et al. does not explicitly disclose subjecting non-discarded objects to bin determination however Smith et al. does. Smith et al. discloses a method for rendering polygons in a computer graphics system using clipping and binning techniques (see lines 1-8 of abstract and #208 of Figure 3). Smith et al. also discloses utilizing a, “binsorter” to identify which tiles, sub-regions of a display, are intersected by an object by defining the determination region with a bounding box (see column 6, lines 10-20 and Figure 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the rendering method and system of Liu et al. with the clipping and binning techniques of Smith et al. in order to improve performance and reduce costs of a 3-D graphics unit by allowing for the final processed image to be stored in a fixed region of on-chip video memory, reducing memory access bandwidth and enabling the use of a conventional display controller hardware (see columns 3, lines 32-37 and column 4, lines 28-40 of Smith et al.). Note, in reference to claim 11, Liu et al. also discloses a machine readable medium having stored a plurality of instructions to execute the rendering methods as disclosed above (see columns 7-8, lines 60-31). Smith et al. does not explicitly disclose instructions for performing bin determination on non-discarded objects however, it is well known in the art that graphics processing cannot be executed without some type of processing unit and instructions to direct the processing unit on how to process the data (Official Notice). Further, some device must be instructed to execute the processing of data in order for the “binning” of data into specific sub-regions of memory to occur. Therefore, it would have been obvious to one of ordinary skill in the art to implement instructions for performing the bin determination of Smith

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et al. Note, in reference to claim 21, Liu et al. discloses performing the above disclosed rendering techniques in a rendering system (see column 6, lines 27-33 and Figure 7).

In reference to claims 2, 12 and 22, Liu et al. and Smith et al. disclose all of the claim limitations as applied to claims 1, 11 and 21 respectively above. Liu et al. discloses defining a visible region using a first rectangle as a display image area in guard memory (see #410 of Figures 5a & 5b).). Liu et al. also discloses the guard memory storing a set of pixels of an image plane, arranged in a pixel array, which extends beyond the display image area of the image plane (see column 3, lines 13-16, column 5, 19-25 and #510 of Figures 5a & 5b). Note, the office interprets the “first rectangle” of applicant’s claims to coincide with the area of a color buffer because the guard memory stores pixel data, well known to comprise of color data (see column 1, lines 28-30 of Liu et al.).

In reference to claims 4, 14 and 24, Liu et al. and Smith et al. disclose all of the claim limitations as applied to claims 1, 11 and 21 respectively above. Neither Liu et al. nor Smith et al. explicitly disclose rendering portions of the scene non-optimally when the buffer resolution exceeds the threshold however, ideally, a video buffer is configured to store a just amount of data so as to allow for peak optimal processing. Further, it is well known in the art that if a buffer size is increased, more data is stored and processed, requiring more processing cycles and resources to render the data (Official Notice). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to “non-optimally” render the scene when the buffer resolution had exceeded the threshold.

In reference to claims 6 and 16, Liu et al. and Smith et al. disclose all of the claim limitations as applied to claims 1 and 11 above in addition, Smith et al. discloses configuring the

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processing of object information in tiles of the display based on a test from a bounding box enclosing the object (see column 6, lines 21-28). Note, the office interprets Smith et al. to disclose the buffer resolution, represented by the second rectangle, to be at or below the threshold because the office interprets the second rectangle substantially similar to the rectangle representing a portion of the display of Smith et al. (see column 6, lines 13-15 and Figure 7).

In reference to claims 7, 8, 17 and 18, Liu et al. and Smith et al. disclose all of the claim limitations as applied to claims 1 and 11 above in addition, Smith et al. discloses aligning the corner of the second rectangle to a zone and configuring the width of the second rectangle to be a multiple of a zone width (see outer rectangle representing portion of display #50 of Figure 7). Note, the office interprets Smith et al. to disclose the buffer resolution, represented by the second rectangle, to be at or below the threshold because the office interprets the second rectangle substantially similar to the rectangle representing a portion of the display of Smith et al. (see column 6, lines 13-15 and Figure 7). Further, since the corners of the outer rectangle are aligned with tile corners the office interprets the outer rectangle configured to be a multiple of a zone width which the office interprets as being substantially similar to the threshold (see outer rectangle of Figure 7 which is represented by 4 tile widths, #52a-d).

In reference to claims 10 and 20, Liu et al. and Smith et al. disclose all of the claim limitations as applied to claims 1 and 11 respectively above. Although Smith et al. discloses the zones to have the same size when first and second rectangles are not coinciding (see tiles 52a-p of Figure 7), neither Liu et al. nor Smith et al. explicitly disclose configuring zones having a same size when the first and second rectangles coincide. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to configure the sizes of the tiles of

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Smith et al. to be the equal even when both rectangles coincide. Applicant has not disclosed that configuring zones to have the same size when both buffer and display view representative rectangles coincide provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with tile sizing configuration of Smith et al. because Smith et al. discloses a second intersection processing stage where a more precise tile intersection process is performed therefore, tiles of all the same size are not necessarily needed. Therefore, it would have been obvious to one of ordinary skill in this art to modify Smith et al. to obtain the invention as specified in claims 10 and 20.

4. Claims 3, 13 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (U.S. Patent 6,144,387), Smith et al. (U.S. Patent 6,424,345 B1) and further in view of Callahan et al. (U.S. Patent 4,982,345).

In reference to claims 3, 13 and 23, Liu et al. and Smith et al. disclose all of the claim limitations as applied to claims 1, 11 and 21 respectively above. Neither Liu et al. nor Smith et al. explicitly disclose defining the first and second rectangles by state variables containing screen space location of rectangle corners however Callahan et al. does. Callahan et al. discloses an interactive computer graphics system for clipping an operator selected area of a display (see lines 1-27 of abstract). Callahan et al. discloses defining first and second rectangles representing two viewport windows, used in clipping, by rectangle corner screen coordinate space variables (see columns 5-6, lines 67-25 and Figure 3B). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the rectangle locating variables of Callahan et al. with the rendering method and system of Liu et al. and the clipping and binning

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techniques of Smith et al. in order to obtain the position of the rectangles in display device screen space and correspond these positions to buffered screen space display data thereby making a more efficient interactive graphics system (see columns 1-2, lines 64-2 of Callahan et al.).

5. Claims 5, 9, 15, 19 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (U.S. Patent 6,144,387), Smith et al. (U.S. Patent 6,424,345 B1) and further in view of Fliflet (U.S. Patent Application Publication 2002/0140710 A1).

In reference to claims 5, 15 and 25, Liu et al. and Smith et al. disclose all of the claim limitations as applied to claims 4, 14 and 24 respectively above. Neither Liu et al. nor Smith et al. explicitly disclose rendering zones larger than optimal zone size when the buffer resolution exceeds a threshold however Fliflet does. Fliflet discloses a method for balancing workloads in software and hardware associated with a zone renderer (see lines 1-2 of abstract) where the effect of adjusting the size of a zone increases or decreases cache efficiency and processor workload (see paragraph 38, last 4 lines). Fliflet also discloses the zone size capable of being adjusted within a range between the cache size (minimum) and the screen size (maximum) (see paragraph 45, lines 1-3). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to increase zone size to larger than optimal size when a buffer resolution exceeds a threshold with the rendering method and system of Liu et al. and the clipping and binning techniques of Smith et al. in order to compensate for the extra amount of data which exceeds the buffer resolution threshold thereby greatly effecting optimal overall system performance (see paragraph 38, lines 6-17 of Fliflet).

In reference to claims 9 and 19, Liu et al. and Smith et al. disclose all of the claim limitations as applied to claims 1 and 11 respectively above. Neither Liu et al. nor Smith et al.

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explicitly disclose extending zones along the edges of the second rectangle out to the first rectangle boundaries to define zones larger than optimal zone size when the second rectangle is smaller than the first. Fliflet discloses a method for balancing workloads in software and hardware associated with a zone renderer (see lines 1-2 of abstract) where the size of a zone is capable of being adjusted within a range between the cache size (minimum) and the screen size (maximum) (see paragraph 45, lines 1-3). Further, when the second rectangle is smaller than the first rectangle of applicant's claims, the buffer resolution has exceeded the threshold because there is more data to be rendered than able to be rendered by the current size of the buffer. Therefore, expanding zone sizes out to the edges of the first rectangle, disclosed by Fliflet to greatly effect system performance (see paragraph 38, lines 6-17), would have been obvious to one of ordinary skill in the art at the time the invention was made in order to compensate for the extra amount of data which exceeds the buffer resolution threshold by also processing such exceeded data. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust zone sizes to edges of a first rectangle when a second rectangle is smaller than a first rectangle with the rendering method and system of Liu et al. and the clipping and binning techniques of Smith et al. in order to compensate for the extra amount of data which exceeds the buffer resolution threshold thereby greatly effecting optimal overall system performance (see paragraph 38, lines 6-17 of Fliflet).

References Cited

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

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- a. Kaso (U.S. Patent 5,850,475)
 - Kaso discloses a method and apparatus for dividing an image area into plural rectangular subareas and boundary areas.
- b. Zhu et al. (U.S. Patent 6,344,852)
 - Zhu et al. discloses a system and method implemented in hardware to optimize the binning of graphics data.
- c. Ludtke (U.S. Patent 6,377,276 B1)
 - Ludtke discloses a method and apparatus for clipping a bitmap region corresponding to a logical intersection of a clipping region and a visible window.
- d. Baltaretu et al. (U.S. Patent 6,437,780 B1)
 - Baltaretu et al. discloses a geometry tiler identifying tiles of a computer screen which are covered by a graphics primitive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Antonio Caschera whose telephone number is (703) 305-1391. The examiner can normally be reached Monday-Thursday and alternate Fridays between 7:00 AM and 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso, can be reached at (703)-305-3885.

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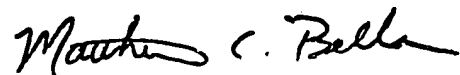
(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding
should be directed to the Technology Center 2600 Customer Service Office whose telephone
number is (703) 306-0377.

aac

9/16/03



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